CLAIMS

1. A device (10; 71) for controlling the direction of a radiation beam (12; 70), the device comprising:-

transmission means (14; 71) for transmitting the radiation beam (12; 70) from a radiation source (62; 77); and

steering means (28, 30, 32, 34; 72, 72a, 72b, 73) for steering the radiation beam (12; 70);

characterised in that the transmission means (14; 71) comprises a body of magnetic material having a central axis (24; 78) which forms an aperture through which the radiation beam (12; 70) passes, the central axis (24; 78) being parallel to and coincident with the direction of the radiation beam (12; 70) prior to incidence on the transmission means (14; 71);

and in that the steering means (28, 30, 32, 34; 72, 72a, 72b, 73) causes the radiation beam (12; 70) to emerge from the transmission means (14; 71) offset relative to the central axis (24; 78) in free space in a known direction.

2. A device according to claim 1, wherein the beam (12; 70) is offset relative to the central axis (24; 78) and steered thereabout so as to define as angle θ between the central axis (24; 78) and the emergent direction.

3. A device according to claim 1 or 2, wherein the steering means (28, 30, 32, 34) comprises magnetic means.

4. A device according to claim 3, wherein the magnetic means applies a gradient in magnetisation across the aperture.

5. A device according to claim 4, wherein the gradient in magnetisation occupies a plane which is not perpendicular to the central axis (24).

6. A device according to claim 4 or 5, wherein the gradient of magnetisation rotates about the central axis (24).

7. A device according to any one of the preceding claims, wherein the offset between the beam (12) and the central axis (24) is angular.

8. A device according to any one of the preceding claims, wherein the offset between the beam (12) and the central axis (24) is spatial.

9. A device according to claim 1 or 2, wherein the steering means (72, 72a, 72b, 73) comprises a ferrite material (73) arranged within a solenoid (72, 72a, 72b) so as to rotate a linearly polarised beam (70) about the axis (78).

10. A device according to claim 9, further comprising a pair of polarisers (75, 76) arranged adjacent either end face of the ferrite material (73) so as to reflect or to allow the beam (70) to pass.

11. A device according to claim 10, further comprising an isolator (79) arranged to prevent a reflected portion of the beam reflected from the polarisers (75, 76) from entering a horn (77) used to generate the beam (70).

12. A device according to claim 11, wherein the isolator (79) comprises an absorbing material which absorbs that portion of the beam reflected from the polarisers (75, 76).

13. A device according to any one of the preceding claims, further comprising a reflective surface (64, 81) located adjacent a face of the body (14; 71) from which the beam (12; 70) emerges.

14. A device according to claim 13, wherein the reflective surface (64; 81) comprises a cone having its apex facing the face and its central axis coincident with the central axis (24; 78).

15. A device according to any one of the preceding claims, wherein the beam (12; 70) is swept through 360° in a plane which is perpendicular to the central axis (24; 78).

16. A device according to any one of the preceding claims, wherein the beam (12; 70) comprises microwave radiation.

17. A device according to claim 16, wherein the microwave radiation is millimetric radiation.

18. A device according to claim 17, wherein the radiation is at Ka band (26.5 to 40GHz).

19. A device according to claim 17, wherein the radiation is at W-band (75 to 110GHz).

20. A communications unit (60) incorporating a device according to any one of the preceding claims, and which includes radiation receiving means, modulation and demodulation means for modulating and demodulating information onto and from the radiation beam (12; 70).

21. A communications system comprising a plurality of communications units according to claim 20.

AMENDED SHEET

is microwave radiation.

21. A device, as in any preceding claim, characterised in that the beam of radiation is millimetric radiation.

22. A device, as in any preceding claim, characterised in that the beam of radiation is at Ka band (26.5 to 40GHz).

23. A device, as in any of Claims 1 to 21, characterised in that the beam of radiation is at W-band (75 to 110GHz).

24. A device substantially as described herein with reference to the Figures of the accompanying drawings.

25. A communications unit incorporating a device as in any preceding claim including, radiation receiving means and modulation and demodulation means for modulating and demodulating information onto and from radiation.

26. A communications unit substantially as described herein with reference to the Figures of the accompanying drawings.

27. A communications system comprising a plurality of units as in Claims 25 or 26.

28. A communications system substantially as described herein with reference to the

Figures of the accompanying drawings.